

**USDA, ARS, BA, BOVINE FUNCTIONAL GENOMICS LABORATORY**

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**“DEVELOPMENT AND COMMERCIALIZATION OF A HIGH-DENSITY DNA ASSAY FOR CATTLE”**

A fiber optic beadchip was developed that specifically assays single nucleotide polymorphism (SNP) DNA markers over 58,000 locations distributed relatively evenly across the bovine genome. Development of this genetic analysis resource for cattle has several technology components. The first technology developed was a SNP discovery strategy built on next-generation DNA sequencing to identify the additional SNP needed to build a proper beadchip. The second development was the design of a SNP selection algorithm to optimally select SNP for genotyping assays. This algorithm was implemented and distributed as a stand-alone computer software package called SNP-Select. The final, and probably most important transfer of technology, was the commercialization of the resulting DNA assay as a high quality research tool (cattle beadchip). As a direct result of this product commercialization as the BovineSNP50, this DNA assay was immediately available to research groups around the world. For tools like the BovineSNP50 to be useful, highly informative markers must be distributed throughout the genome and be combined into a single process. The genotypes from this assay can map DNA locations affecting important traits with unprecedented power or can predict genetic values for a wide variety of traits.